CLAIMS

That which is claimed is:

1. A polymerization process comprising:

polymerizing in a loop reactor having an inner surface, at least one olefin monomer in a liquid medium to produce a fluid slurry comprising solid olefin polymer particles in a liquid medium, wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 120 micro inches.

2. The process of claim 1 wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 110 micro inches.

3. The process of claim 1 wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 90 micro inches.

4. The process of claim 1 wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 70 micro inches.

5. The process of claim 1 wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 50 micro inches.

6. The process of claim 1 wherein said inner surface of said loop reactor has a root mean square surface roughness less than about 30 micro inches.

7. A polymerization process comprising:

a first polymerization step comprising polymerizing in a loop reactor at least one olefin monomer in a liquid medium to produce a first product fluid slurry comprising a liquid medium and solid olefin polymer particles having a melt index less than 0.3 gm/10 min and

a second polymerization step comprising polymerizing in said loop reactor at least one olefin monomer in a liquid medium to produce a second product fluid slurry comprising a liquid medium and solid olefin polymer particles having a melt index greater than 0.4 gm/10 min.

8. The process of claim 7 wherein the solid olefin polymer particles produced in said first polymerization step have a melt index less than 0.2 gm/10 min., and the solid olefin polymer particles produced in said second polymerization step have a melt index greater than 0.3 gm/10 min.

9. The process of claim 7 wherein the solid olefin polymer particles produced in said first polymerization step have a melt index less than 0.1 gm/10 min., and the solid olefin polymer particles produced in said second polymerization step have a melt index greater than 0.3 gm/10 min.

10. The process of claim 7 wherein the solid olefin polymer particles produced in said first polymerization step have a melt index less than 0.2 gm/10 min., and the solid olefin polymer particles produced in said second polymerization step have a melt index greater than 0.5 gm/10 min.

11. The process of claim 7 wherein the solid olefin polymer particles produced in said first polymerization step have a melt index less than 0.1 gm/10 min., and the solid olefin polymer particles produced in said second polymerization step have a melt index greater than 0.5 gm/10 min.

12. A slurry loop polymerization reactor having an inner surface comprising:

a plurality of major segments; and

a plurality of minor segments;

wherein each of said major segments is connected at one end thereof to one of said minor segments, and is connected at an opposite end thereof to another minor segment such that said major segments and said minor segments form a continuous flow path adapted to convey a fluid slurry, said reactor being substantially free from internal obstructions, and wherein said inner surface of said reactor has a root mean square surface roughness less than about 120 micro inches.

13. The loop polymerization reactor of Claim 12 wherein said inner surface of said reactor has a root mean square surface roughness less than about 110 micro inches.

14. The loop polymerization reactor of Claim 12 wherein said inner surface of said reactor has a root mean square surface roughness less than about 90 micro inches.

15. The loop polymerization reactor of Claim 12 wherein said inner surface of said reactor has a root mean square surface roughness less than about 70 micro inches.

16. The loop polymerization reactor of Claim 12 wherein said inner surface of said reactor has a root mean square surface roughness less than about 50 micro inches.

17. The polymerization process of Claim 7 wherein said loop reactor has an inner surface, said inner surface having a root mean square surface roughness less than about 120 micro inches.

18. The polymerization process of Claim 7 wherein said loop reactor has an inner surface, said inner surface having a root mean square surface roughness less than about 100 micro inches.

19. The polymerization process of Claim 7 wherein said loop reactor has an inner surface, said inner surface having a root mean square surface roughness less than about 90 micro inches.

20. The polymerization process of Claim 7 wherein said loop reactor has an inner surface, said inner surface having a root mean square surface roughness less than about 70 micro inches.

21. The polymerization process of Claim 7 wherein said loop reactor has an inner surface, said inner surface having a root mean square surface roughness less than about 50 micro inches.

22. The polymerization process of Claim 7 wherein said loop reactor has an inner surface, said inner surface having a root mean square surface roughness less than about 30 micro inches.